

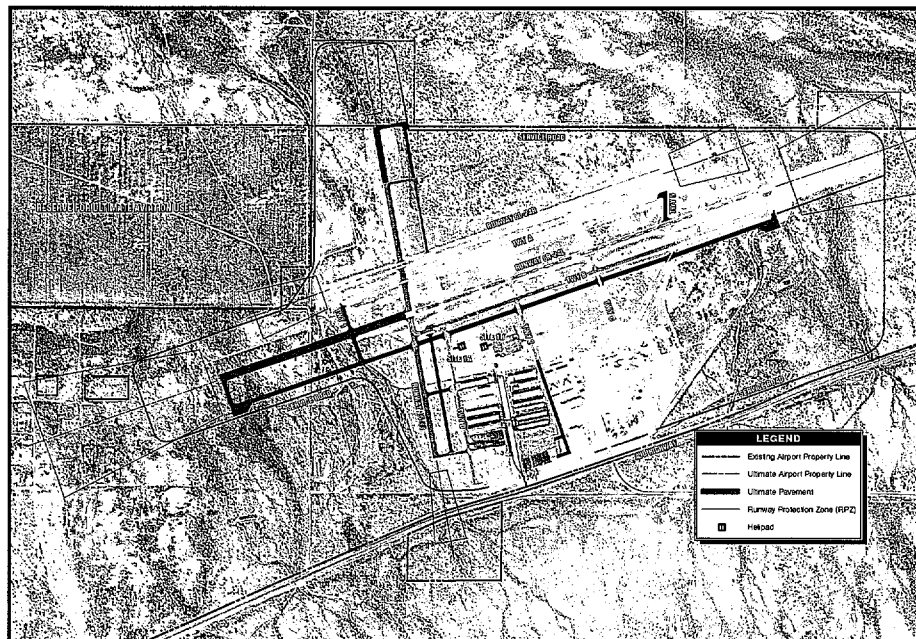


## *Chapter Four*

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# *DEVELOPMENT ALTERNATIVES*

# DEVELOPMENT ALTERNATIVES



efficient, cost effective, and minimizes environmental impacts.

When analyzing alternatives for development, consideration must also be given to a "do nothing" or "no build" alternative as well as the possibility of removing aviation services altogether. As these

In the previous chapter, airfield and landside facilities that would satisfy the demand for the planning horizon levels were identified. The purpose of this chapter is to examine rational airport development alternatives from the standpoint of how well they address the planning horizon demand levels. The possible combinations are endless, so some intuitive judgement must be used to identify those alternatives which have the greatest potential for implementation.

The two major functional areas of airside and landside facilities interrelate and affect the development potential of one another. Therefore, they must be examined both individually and collectively to ensure a final plan that is functionally

alternatives are not without major impacts and costs to the public, they are also addressed in this chapter.

The alternatives considered are compared using environmental, economic, and aviation factors to determine which of the alternatives will best fulfill the local aviation needs. With this information, as well as the input and direction from local government agencies and airport users, a basic airport concept can evolve into a realistic development plan.

## **DO-NOTHING ALTERNATIVE**

The "do-nothing" alternative essentially considers keeping the airport in its

present condition and not providing for any type of improvement to the existing facilities. The primary result of this alternative would be the inability of the airport to satisfy the projected aviation demands of the airport service area.

The Tucson metropolitan area continues to experience dynamic socioeconomic growth. Forecasts approved by the Arizona Department of Economic Security indicate that strong growth will likely continue throughout and beyond the long range planning horizon. This reason, combined with more favorable forecasts for the general aviation industry and Ryan Airfield's role as a reliever airport, indicate a future need for improved facilities. Improvements recommended in the previous chapter include a longer runway, improvements to the taxiway system, improvement of navigational aids, and the construction of additional conventional, corporate, and T-hangars. Without these facilities, regular users of the airport will be constrained from taking maximum advantage of the airport's air transportation capabilities.

Ryan Airfield is one of two general aviation reliever airports in the Tucson metropolitan area. Although the Tucson International Airport location provides for a significant amount of general aviation use, its primary role is to accommodate commercial aviation. General aviation travelers often prefer utilizing reliever type airports due to less congestion and ease of use.

Moreover, if demand continues to grow, it will be critical that Ryan Airfield accommodate a portion of this growth to

ensure that adequate capacity is available for the future at Tucson International Airport. General aviation airports not only provide convenience to general aviation users, but also help to avoid a major concentration of smaller general aviation aircraft and large commercial aircraft at a single airport.

An overall impact of this alternative will likely be the inability to attract certain businesses and industries seeking locations with adequate and convenient aviation facilities. Ryan Airfield has much to offer in terms of airfield and landside facilities. Without regular maintenance and additional improvements, existing and potential users and business for Ryan Airfield could be lost.

To propose no further development at Ryan Airfield would adversely affect the long-term viability of the airport, resulting in negative economic affects on the Tucson metropolitan airport system and the community. Therefore, the no development alternative is not considered as prudent or feasible.

## **TRANSFER AVIATION SERVICES**

The alternative of shifting aviation services to another existing airport was found even less desirable due to the lack of available airports having the facilities or the potential that Ryan Airfield provides the Tucson metropolitan area. In 1998, Ryan Airfield based 234 aircraft and experienced over 156,000 operations.

There are only two other publicly-owned general aviation airports in the region which could potentially serve the demand at met by Ryan Airfield: Tucson International Airport (TIA) and Avra Valley Airport. As indicated earlier, the primary role of TIA is to serve the commercial service needs of the region. It can accommodate some growth in general aviation activity and has been planned accordingly. The long range capacity of TIA, however, can best be protected if the designated reliever airports absorb a share of the increasing general aviation activity.

The other public airport at Avra Valley is developing rapidly just serving demand on the north side of Tucson. In addition to the considerations of capacity previously described, Avra Valley's location does not provide convenient access to general aviation users on the south side of Tucson.

Other public airports are too far away to adequately serve the needs of the southwest Tucson general aviation users. Even if they were convenient enough, they would require a significant upgrade in facilities to meet those currently available at Ryan Airfield.

To impose the demands now served by Ryan Airfield on TIA and Avra Valley Airport would be a undue burden that could not be absorbed within a reasonable period of time. The locations of Ryan Airfield in the southwest portion of the metropolitan area, TIA in the southeast, and Avra Valley Airport in the northwest provides a highly desirable balance in access to general aviation services. If the services and facilities available at Ryan Airfield were shifted to another airport, this

balance would be upset. If Ryan Airfield were to be abandoned, essentially one-third of the aviation capabilities and convenience in the region would be lost. This closure would reduce the ability of the region to accommodate future growth.

Additionally, the flexibility so important in aviation planning would all but be eliminated. Ultimately, additional airports would need to be developed to provide necessary aviation capacity. Therefore, transferring services from Ryan Airfield to another airport would not only damage the aviation system but would also hinder economic development in the region.

## ***DEVELOPMENT OF A NEW AIRPORT***

The alternative of developing an entirely new airport facility in the Tucson metropolitan area to meet projected aviation demands was also considered. Similarly, this alternative was found to be unacceptable primarily due to economic and environmental considerations. Land acquisition, site preparation and the construction of an entirely new airport near an urbanized area can be a very difficult and costly action. In addition, closing Ryan Airfield would mean the loss of a substantial investment in a transportation facility that can still be utilized and readily expanded. In a situation where public funds are limited, the replacement of a functional and expandable airport facility would represent an unjustifiable loss of a significant public investment.

From the social, political, and environmental standpoints, the commitment of a new large land area must also be considered. There has been significant opposition in the past to attempts to develop new airports in the county. Furthermore, the development of a new airport similar to Ryan Airfield would likely take a minimum of ten years to become a reality. The potential exists for significant environmental impacts associated with disturbing a large land area when developing a new airport site. In addition, the location of the new site would likely be less convenient than Ryan Airfield.

Overall, transferring service to an existing airport in the region or to an entirely new facility are unreasonable alternatives that should not be pursued further at this time. Ryan Airfield is fully capable of accommodating its share of the long range aviation demands of the area and should be developed in response to those demands. The airport has the potential to continue to develop as a quality general aviation facility that could greatly enhance the economic development of the metropolitan area.

## **AIRPORT DEVELOPMENT ALTERNATIVES**

A commitment to remain at the existing site and develop facilities sufficient to meet the long-range aviation demands entails the following requirements:

- Provide sufficient airside and landside capacity to meet the long range planning horizon level demand of the area.

- Develop the airport in accordance with the currently established FAA criteria.

**Exhibit 4A** summarizes the major development considerations for the airport which will be used in the alternatives analysis to follow. These were derived from the facility needs analysis in Chapter Three as well as Planning Advisory Committee (PAC) input.

The development considerations for the airport have been grouped into the two functional areas of airside and landside. While many of these development considerations reflect projects or topics which are demand driven (the need for hangars, or additional runway length), several are functional in nature (taxiway and road circulation), but are still important considerations in the overall development of the airport and the master planning effort.

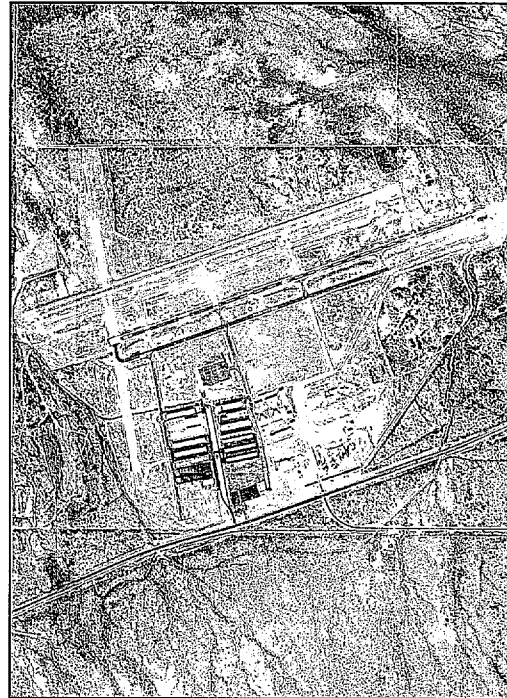
## **AIRFIELD CONSIDERATIONS**

The airfield system typically requires the greatest commitment of land area and often imparts the greatest influence on the identification and development of other airport facilities. In addition, FAA has established an array of design standards that must be considered when evaluating potential airfield improvements. These criteria can have a significant impact on the viability of various alternatives designed to meet airfield needs.

The 1990 Master Plan considered and discussed a variety of potential airfield development schemes to provide an upgraded primary runway for corporate

## AIRFIELD CONSIDERATIONS

- Upgrade of the primary runway to serve B-III, and ultimately, D-II aircraft
- Improve current minimums and provide additional approaches utilizing Global Positioning System (GPS) technology
- Taxiway circulation and high speed exits
- Helicopter landing areas
- Protection of runway approaches



## LANDSIDE CONSIDERATIONS



- Establish terminal focal point on flightline
- Locations for various types of hangar development
- Locations for flight training campus/dormitory
- On-airport road circulation
- Location for fuel facilities
- Location for airport maintenance facilities



activity, a parallel runway for capacity, and a paved crosswind runway. Several orientations were considered for the development of the parallel runway system. The recommended and adopted plan for the airfield included the development of a runway parallel to the primary runway that was in place, the upgrade of that primary runway with an extension to the southwest, and the paving of the crosswind runway.

Since that time, the parallel runway has been constructed and the paving of the crosswind runway has been approved for the summer of 1998. In addition, a major land acquisition program is nearing completion that reserves the area for the upgrade of the primary runway. Given the significant planning effort that was involved to determine this airfield plan, and the commitment that has already taken place in its implementation, the alternatives analysis of this Master Plan update will serve to refine the airfield plan rather than reinvent it. The facility needs from the last chapter do not suggest any significant changes to the plan will be necessary. Therefore, the following subsections will discuss those areas of refinement that may be necessary for the runways, taxiways, and navigational aids. Options for a helicopter landing area will also be considered. Property acquisition recommendations will also be refined as necessary.

## Runways

The facility requirements indicated that the primary runway should be planned to meet the needs of a full range

business jets (ARC D-II) as well as aircraft used in firefighting (ARC B-III). This will require widening the runway to 100 feet, strengthening the pavement to 73,000 pounds dual wheel loading, and extending to an ultimate length of 8,300 feet.

The 1990 Master Plan recommended extending the runway to the southwest after considering an extension to the northeast as well as different orientations. The southwest extension achieves the greatest development flexibility, optimizes land use compatibility, and provides the best airspace and airfield capacity. The airport's property now is adequate to accommodate the runway extension as well as encompass the runway protection zone and provide additional buffer from future encroachment in the approach from the southwest. Therefore, it is recommended that the upgrade of Runway 6R-24L be maintained as previously planned. **Exhibits 4B and 4C** both depict the proposed extension of the runway.

As earlier indicated, crosswind Runway 15-33 is a paved 4,000-foot long runway. This was another recommendation from the 1990 Master Plan. The Facility Requirements in Chapter Three indicated that an ultimate length of 4,800 feet would be desirable.

Alternatives for the future extension of the crosswind runway can be considered on each end. Adding the full 800-foot extension on the south end, however, would require relocating the highway. Thus an extension to the north and a split extension were considered as viable alternatives.

**Exhibit 4B** depicts an extension to the north end of Runway 15-33. This extension would take the runway to the existing property line on the north end. Land acquisition would be necessary to accommodate the runway safety area, object free area, and runway protection zone. The acquisition depicted on the exhibit would encompass up to 40 acres.

**Exhibit 4C** depicts an alternative that would place a portion of the extension on each end of the runway. As shown, 300 feet could be added to the south end of the runway before approach clearances over the highway would be affected. The Airport Authority has previously acquired a parcel of property south of the highway to protect the Runway 33 approach. This parcel is large enough that the relocated runway protection zone would remain within airport property. As a result, new property acquisition would be less under this alternative. Up to 22 acres would need to be acquired on the north end. The split extension would also extend the runway further along the existing flightline east of the runway, providing more frontage.

While the split extension would require less property, it would involve higher construction costs. The construction would really be two separate projects in two separate locations. This is typically more expensive than constructing the entire extension on one end. In addition, the split extension would require both thresholds to be relocated. This would involve constructing new taxiway connections on both ends, thereby increasing pavement costs. Threshold lighting and runway numbers would also need to be relocated on both ends. Therefore, the

potential savings in property acquisition would be lost to additional construction costs.

The split extension would also require the drainageway on the south and west side of the runway to be relocated from the vicinity of the southward extension. At a minimum, the drainageway would need to be setback out of the runway safety area which is 150 feet wide, centered on the runway, and extends 300 feet beyond the runway. This would further add to the construction costs of the split extension.

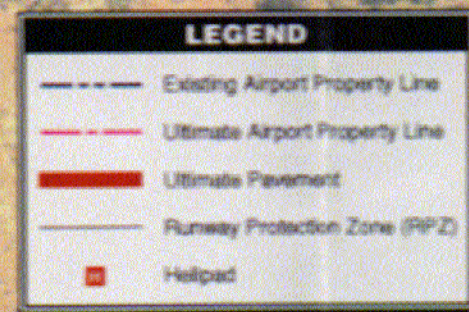
The north extension would be less disruptive to operations on Runway 15-33 during construction. At a minimum, the construction period would be less because activity would be concentrated on one end. Concentrating construction on one end would require only the temporary displacement of one threshold. Finally, an extension to the north would permit the additional safety clearance, now in place over the highway, to remain intact.

### **Taxiways**

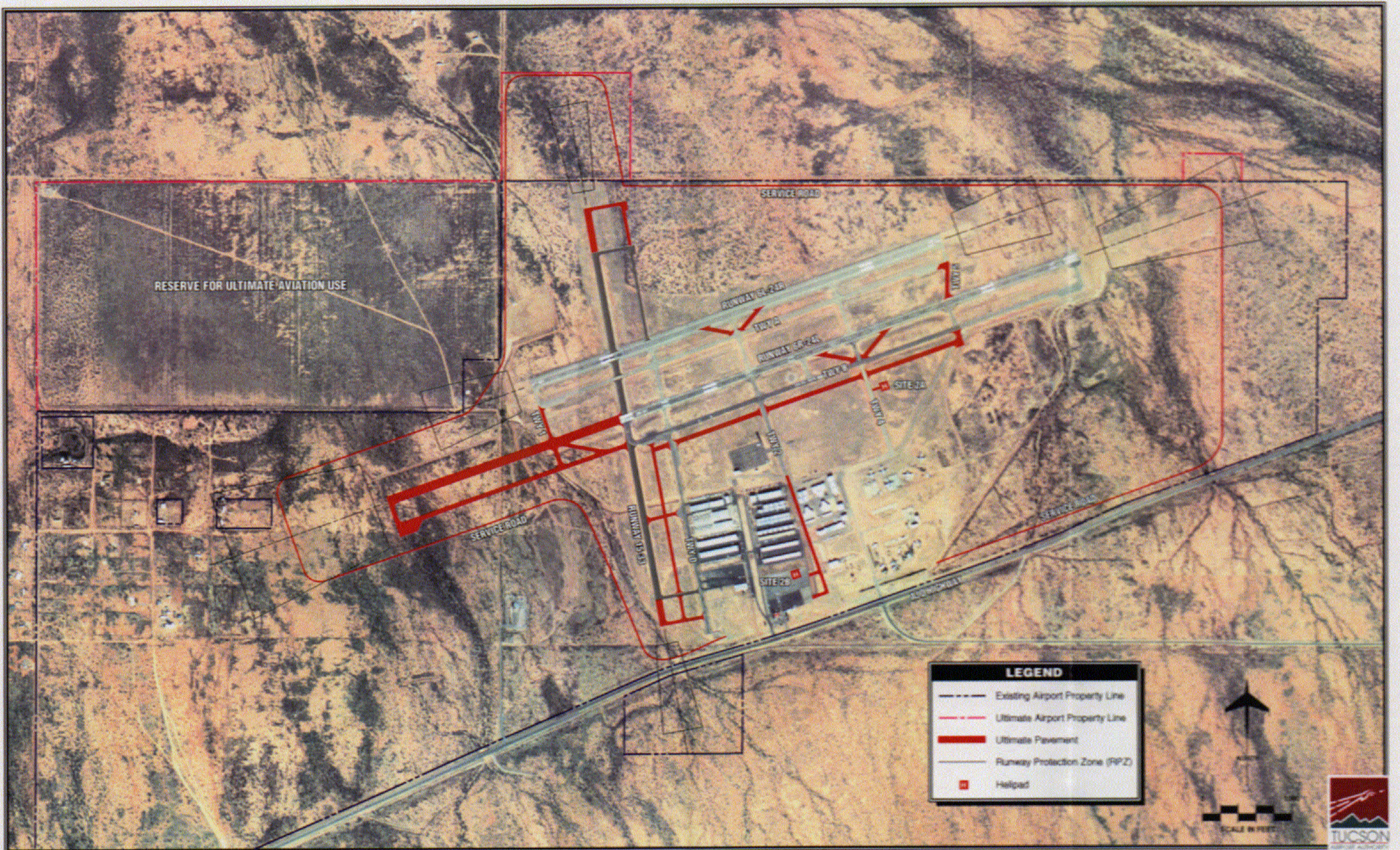
One taxiway consideration will be extending the parallel taxiways with any runway extensions. These are depicted on both **Exhibit 4B** and **4C**. The holding aprons along Runway 6R-24L should be expanded to coincide with the upgrade of the runway to meet airplane design group III standards.

The centerline of parallel Taxiway B is located 300 feet from the centerline of Runway 6R-24L. This separation meets FAA design standards for ARC B-III and D-II aircraft when approach











minimums are not lower than 3/4 mile. If the approach minimums are to be lowered to less than 3/4 mile, the runway-taxiway separation standard increases to 400 feet for D-II. **Exhibit 4B** depicts a new parallel taxiway located further from the runway. This taxiway would more than meet the separation standard. A 152 foot centerline separation from Taxiway B would permit the dual taxiways to be used during VFR weather which prevails 99 percent of the time.

Another option would be to request a "modification to design standard" from the FAA to permit Taxiway B to be used in conjunction with the lower minimums. **Exhibit 4C** depicts the parallel taxiway system under this alternative. Taxiway B would be extended to the full length of Runway 6R-24L. A partial parallel taxiway would be provided in the terminal area to assist ground circulation. This alternative would result in slightly less taxiway construction than that depicted on Alternative 1. Alternative 1 does fully meet the airport design standards if a full CAT I instrument approach is to be considered in the future. If ultimate development should extend along the entire flightline, however, both taxiways could be developed to the full length under either alternative.

With the paving of Runway 15-33, more use of this runway and its parallel taxiway can be expected. The turnouts currently provided help to alleviate conflicts between aircraft using the Taxiway D for access to and from the hangars and flight school on the west side of the terminal area. As traffic using this taxiway increases so will the potential conflicts. This can best be

corrected by dual taxiway access in this area. Both **Exhibits 4B** and **4C** depict a partial parallel taxiway located between Runway 15-33 and Taxiway D. This taxiway can be placed as close as 240 feet from the runway and still meet FAA separation standards. A minimum separation of 105 feet is recommended.

It has been indicated by pilots who use the airport that acute-angled, or high speed, exits would assist in clearing traffic from the runway more efficiently. To be effective, the angled exits would need to be located to maximize utilization. FAA AC 150/5300-13, Change 5, Appendix 9 provides utilization percentages for right-angle and acute-angle taxiway exits. For light, single engine aircraft, the best location is 2,000 to 2,500 feet from the landing threshold. For twin engine aircraft, the best location is between 3,500 and 4,000 feet from the threshold. For aircraft over 12,500 pounds, the location should be 5,000 to 6,000 feet from the threshold.

At Ryan Airfield, traffic is heavily dominated by small single engine aircraft, so high speed exits for larger aircraft will have less impact on airfield efficiency. Therefore, angled exits around 2,000 to 2,500 feet from the threshold were considered. **Exhibit 4C** indicates potential location for acute angled exits on the parallel runways. Before Runway 6R-24L is extended, angled exits could be considered at midfield for both directions. After the runway is extended, an additional angled exit could be developed further west. The original exit would still be useful for larger aircraft as it would be located approximately 5,100 feet from the ultimate threshold to Runway 6L.

On Runway 6L-24R, the angled exits would also be at midfield. The right-angle exit at this location could be eliminated if the angled exits were implemented.

Both airfield alternatives also indicate a future east connection between the parallel runways. This would involve extending Taxiway 5 to the north and to the east end of Taxiway A. This connection would improve circulation to and from the parallel runway, particularly as the flightline develops to the east. Consequently, this taxiway is a long range recommendation.

### **Helicopter Landing Area**

Helicopters operating at Ryan Airfield currently arrive and depart on the runways. Therefore, they enter the pattern and are sequenced with fixed wing aircraft. A designated helicopter landing area, or helipad, would establish a separate landing surface from which helicopters could land and takeoff simultaneously with aircraft on the runway. Helipad sites were considered in several locations around the terminal area. Four different potential sites are depicted on **Exhibits 4B and 4C**.

Sites 1A and 1B are depicted on **Exhibit 4B** are both located on the northwest side of the terminal area. Site 1A is adjacent to Taxiway D, while Site 1B is located adjacent the north parking apron. The two sites are located to be at least 700 feet from the centerline of Runway 6R-24L. This is the FAA design standard separation for a helipad that could serve rotorcraft weighing over 12,500 pounds. Both

sites are in close proximity to the control tower and helicopters can readily hover taxi to other portions of the terminal area. There is space in the vicinity of Site 1B that could be developed with services for helicopters.

Both sites would permit aircraft to approach from the west in parallel with the predominant traffic flow at the airport. An additional approach option would be available from the south over the terminal area. For Site 1B, this approach would align with Aviator Way.

**Exhibit 4C** presents two more alternative locations for the helipad. The first (Site 2A) is located northeast of Taxiway C along the flightline of the primary runway. It is set back from Runway 6R-24L 700 feet. This site is very open at the present time and is visible from the tower. The location could affect other terminal area development in the future, however. It is remote from current operations. While this may be an advantage for practice procedures, it will involve extended taxiing to the other parts of the terminal area.

Site 2B is located on the south apron. This would allow helicopters to approach from the south over the highway or parallel to the primary runway orientation. This alternative has an advantage of increased separation between the helipad and the runways. It also places the activity close to the fuel island and the restaurant, but out of the way of other activity and developments.

This location may not be as desirable from an air traffic controller standpoint

because it spreads out operations to all sides of the tower. A location near the current flightline would keep all traffic in view from one side of the control tower. Another potential concern could be the line-of-sight between the helipad and the tower. The shade hangar immediately north of the proposed site could shadow the view from the tower requiring the helipad to be placed farther south on the ramp. This would use more ramp for helicopter operations.

### **Property Acquisition**

Both **Exhibits 4B** and **4C** depict additional property acquisitions that should be considered to protect the runway approaches. **Exhibit 4B** considers the runway protection zones (RPZs) that would be required if the airport were to provide nonprecision GPS approaches to all runway ends that currently have no instrument approach. This includes a 3/4-mile approach for Runway 24L and a full CAT I approach to Runway 6R. **Exhibit 4C** considers no changes to the runway approaches.

The only RPZ's affected by the upgrade in instrument approaches would be on runway 6R-24L where the minimums would be less than a mile. The RPZ's on Runway 6R-24L are affected by the upgrade to ARC D-II as well. **Exhibit 4C** depicts the changes to the RPZ, if minimums are not lowered. To have full control over the RPZ's, property would need to be acquired in the approaches to Runway 24L, Runway 15, and Runway 6L. As depicted, Alternative 2 would encompass approximately 26 acres of property acquisition. This would include 21.5

acres in the Runway 15 RPZ and 4.5 acres in the Runway 24R RPZ.

Under Alternative 1 on **Exhibit 4B**, additional property would need to be acquired to protect a larger RPZ on the Runway 24L approach. The property acquisition for the Runway 15-33 extension would be greater as well because the entire extension is on the north end in this alternative. These two parcels would involve approximately 54 acres, including 40.5 for the Runway 15 RPZ and 13.5 for the Runway 24R RPZ.

Both alternatives include acquisition of a 315 acre tract on the northwest side of the airport. This tract is currently owned by the City of Tucson. The previous master plan recommended acquiring this property to protect the long range viability of the airport. There is adequate space on this tract to ultimately develop a third parallel runway. Acquiring this property also provides a buffer from future encroachment from the northwest.

### **LANDSIDE CONSIDERATIONS**

The orderly development of the terminal area is a critical element of an airport's capabilities, but it is typically the most difficult to control. Many general aviation airports have been developed without proper foresight with regards to the functional elements to be served, often taking the least expensive short term solution. A development approach that picks the path of least resistance can often turn out to be an impediment to the strategic long term growth and viability of the airport.

Allowing operators and tenants to develop wherever they please without regard to a functional plan can result in a haphazard array of buildings and small ramp areas, which can eventually preclude the most efficient use of valuable space along the flight line.

Activity in general aviation terminal areas can be divided into three types: high, medium and low. High activity uses provide the primary aviation services on the airport. These are generally large FBO facilities that provide a full range of services to based as well as transient aircraft. Conventional hangars of at least 10,000 square feet and associated terminal space are typically associated with high activity areas. The best location for high activity areas is along the flight line for ease of access to the airfield.

Medium activity use defines the next level and includes smaller service facilities as well as corporate flight departments. This would include specialized operators, and corporate hangars. Hangars in this medium activity areas will typically be in the 5,000 to 10,000 square foot range. The best location for medium activity uses is off the immediate flight line, but readily accessible. Parking and full utilities should also be provided to this area.

Low activity use defines the area for storage of smaller single and twin-engine aircraft. Low activity users are personal and small business aircraft owners who prefer individual space in small hangars or T-hangars for aircraft storage. Low activity areas can be located in less conspicuous areas. This use category will require electricity, but

does not necessarily need water or sewer utilities.

The 1990 Master Plan called for the continued development of the existing terminal area along the Runway 6R-24L flightline between the runway and Ajo Highway. Over the last decade, development has generally followed the plan, nearly filling in the area between Taxiways 1 and 2 and developing new leaseholds to the east of Taxiway 2. The southeast quadrant has meet all the terminal area needs to date and has room for additional development. To take advantage of the available access and infrastructure that is already in place in this area, it makes sense to continue to develop terminal needs in this quadrant.

At the present time most of the flightline along the primary runway is undeveloped. The only exception is the north parking apron. The ATCT is located in a corner of this parking, and an aircraft wash rack is located in another corner. There are no terminal or hangar facilities adjacent to the ramp. As a result, the ramp is used primarily for aircraft storage. Transient aircraft generally utilize the south apron which is adjacent to the fuel facilities and the restaurant. This requires taxiing through a hangar area. Facilities located along the flightline would reduce the amount of taxiing required to the back portions of the terminal area.

A terminal building along the flightline could serve as a focal point for the airport. This could be a stand alone facility or it could be associated with an FBO hangar. A terminal facility could

also provide a meeting place on the airport for aviation groups, organizations, corporate users, or even the surrounding community.

Another means to encourage use of the flightline would be to establish fuel services in a location closer to the airfield. This would again reduce taxi distances and circulation, as well as make it easier to find the fuel island.

Another consideration is the desire of the airline flight training school to establish a campus and dormitory on the airport. This would permit the school to maintain its students in a more controlled aviation environment.

Finally, an on-airport circulation road will be desirable in the future for safety and security purposes. As activity increases, so will the need for vehicle circulation between different locations in the terminal area. An on-airport circulation road would eliminate airport-related traffic using the highway to go between Aviator Lane and Airfield Drive. The circulation road could permit the airport to control access through a single entrance to improve security. It would also reduce vehicle traffic mixing with aircraft in the operations area, and would provide improved access for fire and emergency response.

The following alternatives discuss option for development of this area.

## **ALTERNATIVE A**

**Exhibit 4D** depicts an alternative that reserves the flightline for larger

development parcels. These parcels, ranging in size from three to over six acres could be leased to develop FBO facilities or aviation-related business requiring large hangars and/or ramp space. The areas behind the flightline would be reserved for T-hangar development and corporate hangar development.

The remaining open area in the southwest corner of the terminal area, adjacent to the flight school would be reserved for future expansion of the flight school. No other development is indicated in the terminal area accessible from Aviator Lane. Under this alternative, the fuel island would remain in its current location on the south side of the south apron. No development is planned adjacent to the north apron.

The area west of and accessible from Airfield Drive would be developed with an additional T-hangar and would also include a five-acre campus site for the flight school. An option could be to not include the T-hangar in this area to provide additional space for the campus on this site. This would make an eight acre site for dormitories and related facilities. An on-airport circulation road would be developed along the south side of the campus to connect Aviator Lane with Airfield Drive.

The primary location for future T-hangar development under this alternative is east of Airfield Drive. This would require the extension of Taxiway C for airfield access. The T-hangar layout depicted in this alternative is designed to permit the airport maintenance building to remain

in its present location. The plan also shows how the aerial firefighting facility can be developed to provide three 60' x 60' maintenance hangars and a parking apron for the firefighting aircraft.

An on-airport road would be extended east from Airfield Drive to serve development of a third area. Taxiway 5 would be extended south for taxiway access. Alternative A, would utilize this new area for T-hangars with access to Taxiway C and corporate parcels with access to Taxiway 5.

**Advantages:** Alternative A provides distinct separations between high medium and low activity functions on the airport. High activity uses are concentrated in the large parcels along the flightline. Another high activity use remains on the Runway 15-33 flight line and is provided room to expand its operation. Medium activity use is located at the east end of the expanded terminal area. Low activity uses continue to be located behind the flightline in the core of the terminal area.

The flight school campus in this alternative is reasonably close to the flight school on a site that could encompass from five to eight acres. Students will be able to walk along or drive on the circulation road to and from the training facility. This alternative also permits the aerial firefighting facilities to be re-developed in their present location without hampering future development. The Airport Authority facilities would stay in their general location as well. The fuel island and administration building

would remain on the south ramp. The maintenance building would remain in place, although it will be necessary to reposition the maintenance yard and the shadeport.

**Disadvantages:** This alternative does not guarantee that the focal point of the airport will be brought to the flightline. It will be up to FBO development in the large parcels to ensure that it is. Airport fuel service will remain in the back of the terminal area, continuing to necessitate longer taxi's. The availability of new corporate size parcels will be dependent upon the extension of Taxiway 5 and an access road. This could result in pressure to develop at least one of the larger flightline parcels for corporate hangars. The location for the campus prevents the full utilization of frontage along Taxiway 2 for aviation-related uses.

## ALTERNATIVE B

**Exhibit 4E** presents an alternative that attempts to bring a focus to the flightline by establishing a primary terminal area featuring a terminal building flanked by FBO hangars fronting a new aircraft parking apron. Additional parcels for general aviation businesses would be established further east along the flightline, again with apron access.

Medium activity uses would be provided parcels in areas behind the flightline in several locations. These parcels would range in size from one to 2.4 acres. There are also two four-acre sites. One is the aerial firefighting site which is anticipated to be developed in the short



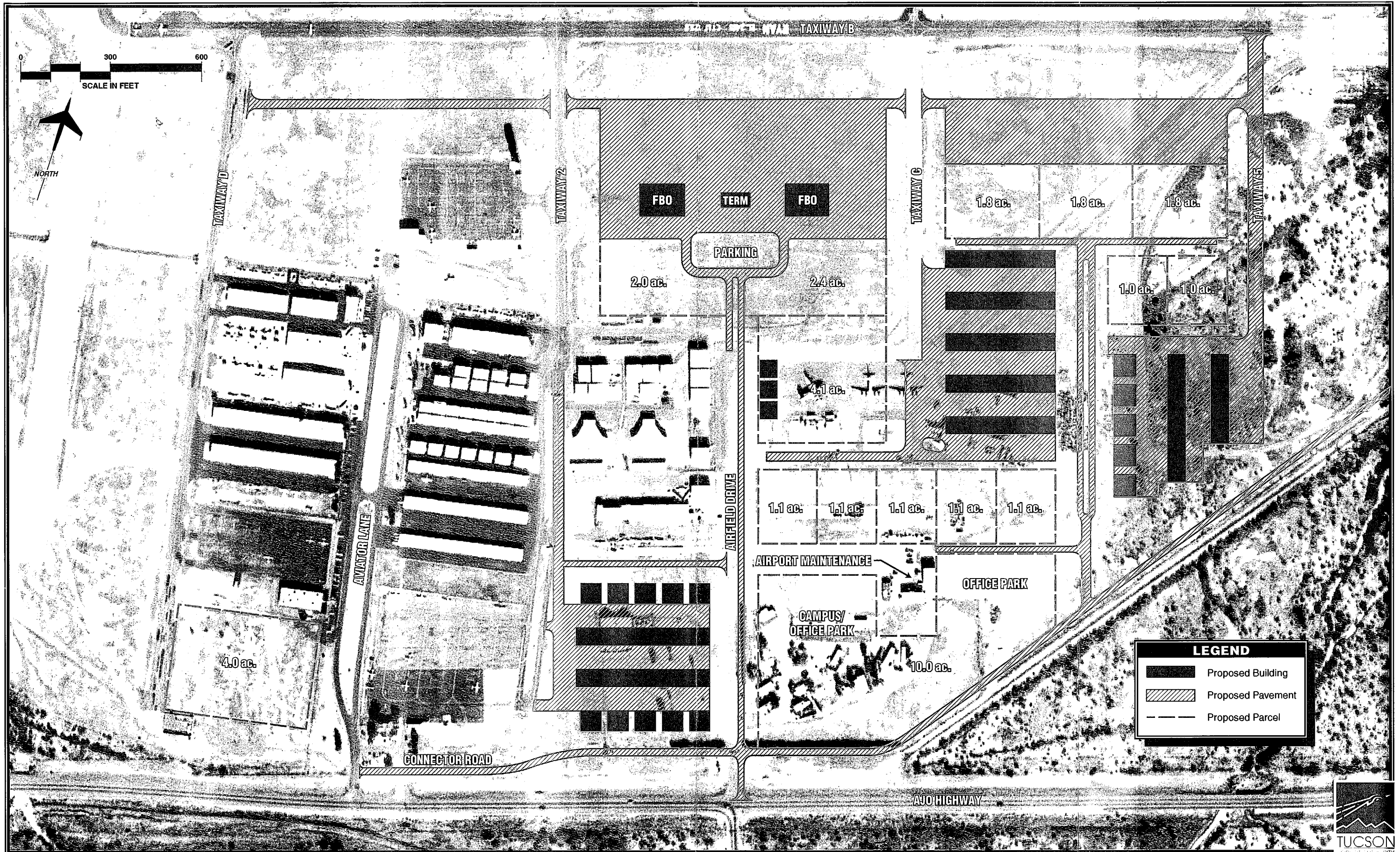


**LEGEND**

- Proposed Building
- Proposed Pavement
- Proposed Parcel







term. The other would be next to the flight school.

Low activity uses would also be located in several different areas. The open area at the south end of Taxiway 2 would be developed for T-hangars and executive box hangars. Similar areas would be available adjacent to Taxiway C and Taxiway 5.

The fuel facilities could remain in their current location to allow for self-serve fueling. Fuel trucks could be used to dispense fuel at the terminal apron. Another option could be to relocate the fuel facilities to the flight line adjacent to the terminal.

The airport maintenance facilities would remain in their current location. The flight school campus would be located immediately south of the maintenance facilities. This area could be developed as an office park should the flight school campus not transpire. There is up to 10 acres for this type of use in this location. As with Alternative A, an on-airport circulation road would be constructed for access between Airfield Drive and Aviator Lane and additional development to the east.

**Advantages:** Alternative B establishes the focal point of the airport near midfield on the flightline. This alternative provides for high, medium and low activity uses next to each of the developable areas. This will allow better flexibility in staging of development, especially the timing of the new areas to the east. The airport maintenance facilities can remain intact in their present location. Accessibility for emergency vehicles is

enhanced by the on-airport circulation roads a well strategically located paved areas within the airport operations area.

The flight school dormitory/campus would be within reasonable walk and drive distance from the flight school operations area. The campus location also serves to reduce the depth of the of taxi into the new development areas of Taxiways C and 5.

**Disadvantages:** Alternative B would require the development of new apron area along the flightline, thereby reducing the use and need for the south apron. It is likely that this apron area would ultimately be redeveloped. The large tract by the flight school will be somewhat limited in potential lessees due the lighter pavement strengths of Taxiway D.

## ALTERNATIVE C

**Exhibit 4F** depicts a third alternative for terminal area development. This alternative attempts to provide a focal point for the airport at the existing north apron. In addition, it attempts to maintain similar functional uses in closer areas.

Under Alternative C, a terminal building would be located adjacent to the north ramp. This building would provide a pilots lobby and lounge, administrative area, and a meeting room. Office space could also be rented in the terminal. The fuel island is also moved up to the north apron under this alternative. Other Airport Authority functions are centralized in this location

as well by moving the airport maintenance to the same area just on the south side of the area.

The area along the flightline to the east would be developed with parcels of a variety of sizes. Ranging from 1.2 acres to 5.5 acres. The aerial firefighting facility would again be fit into the plan at its current location. The current east-west section of Taxiway C would need to be maintained for access to parcels on the north side of the taxiway. Additional T-hangars would be grouped in the south central portion of the terminal area on either side of Airfield Drive.

The area between Taxiway C and Taxiway 5 would be developed in a variety of parcel sizes ranging from 1.4 to 5.5 acres. This would permit FBO's along the flight line, and corporate hangars and specialty operators behind the flightline, and other aviation-related industry to be attracted as well. This alternative extends Taxiways C and 5 further south to provide taxiway access to property next to the highway.

The dormitory/campus would be located immediately adjacent to the flight school operation area under this alternative. The site would provide 4.3 acres for dormitory use. The on-airport circulation road is also provided in Alternative C.

**Advantages:** Alternative C brings the focal point back to the flight line and maximizes the use of the existing north ramp. The Airport Authority facilities would all be centralized under this scenario. The wash rack is already at the ramp, administration, fueling

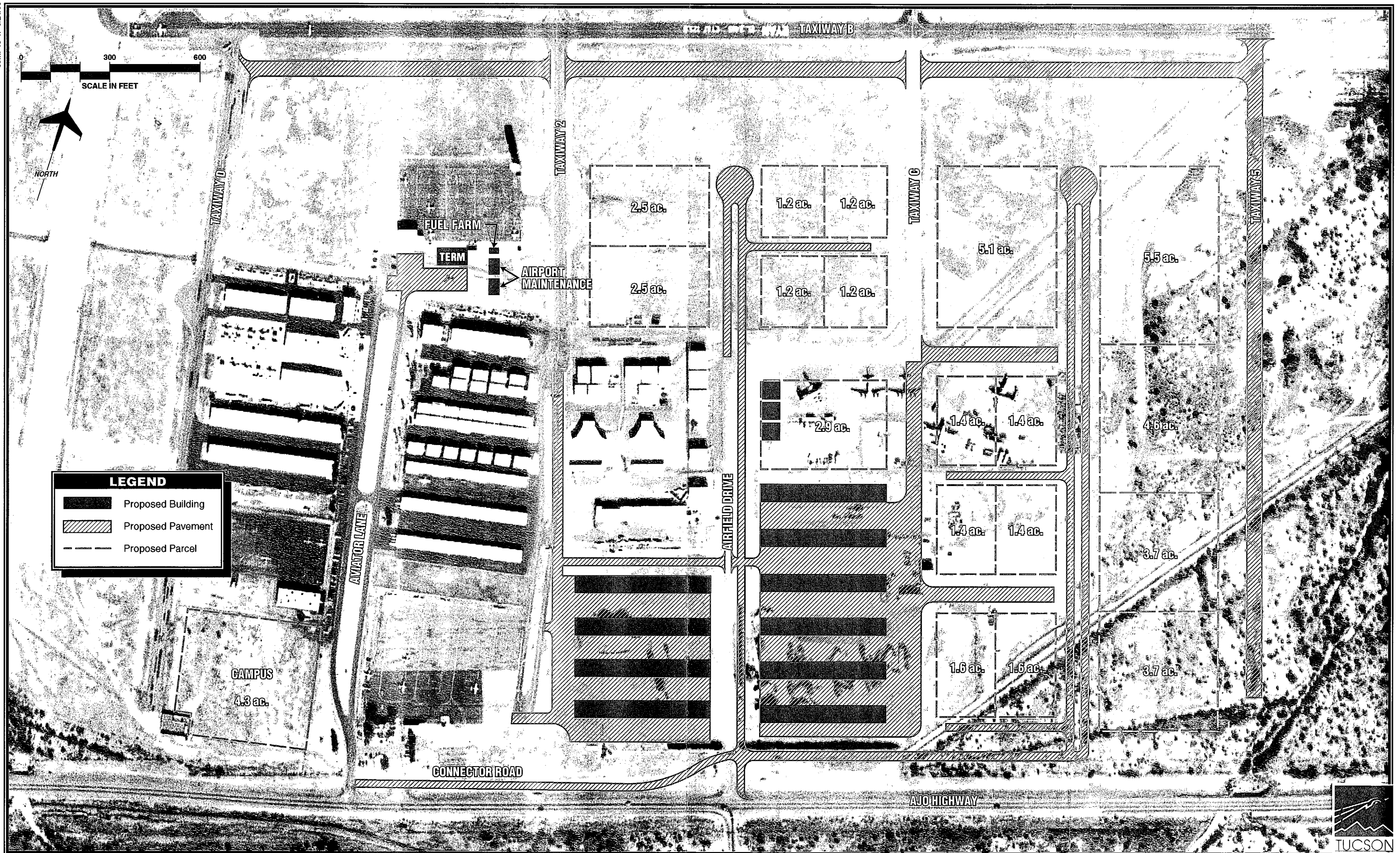
services, and airport maintenance would be moved to one area.

Other similar functions are also centralized. The entire airline flight school operation at the airport would be in one contiguous location. Low activity hangar storage would be located off the flight line and in the west and central portions of the terminal area. Medium activity parcels are located primarily to the east side of the terminal area, and high activity uses are maintained close to the flightline. Taxiways C and 5 are extended further south to open up more room for development in a more concentrated area, thereby creating more efficient use of infrastructure.

**Disadvantages:** Centralizing the Airport Authority facilities under Alternative C would require that most of them be relocated from their current sites. While this would be more functionally efficient it would also be more expensive. Moving the fuel facilities to the flightline and developing a terminal in the same vicinity would move them away from the restaurant which can be an attraction for some general aviation users. The flight school campus site is smaller and does not allow any room for the flight operations to expand in the future.

Finally, the development of Alternative C would extend across the existing drainage diversion dike. This would require the current drainage system to be redeveloped. The 1994 Master Plan included development in this area as well. This will be examined in more detail as these alternatives are





**LEGEND**

- Proposed Building
- Proposed Pavement
- Proposed Parcel



considered further in the preparation of an airport drainage and utility plan.

## ***SUMMARY***

The process utilized in assessing the airfield and landside development alternatives involved consideration of short and long term needs as well as future growth potential. Current airport design standards were considered in every scenario. Safety, both air and ground were given high priority in the analyses.

The recommended development concept for Ryan Airfield must represent a means by which the airport can grow in a balanced manner to accommodate the

planning horizons. In addition the plan must provide the flexibility to meet activity growth beyond the long range planning horizon.

Through further meetings and discussions with the Planning Advisory Committee, the Airport Authority's Planning Committee and staff as well as the general aviation users and the public, a recommended concept will be brought forward. The plan will represent a means by which the airport can continue to effectively serve general aviation needs within the overall operation and development of the airport. This will further evolve into a plan for maintaining and improving general aviation reliever operations at Ryan Airfield.